GENERAL LIBRARY
SEP 11 1922
UNIV. OF MICH.

SCHOOL AND SOCIETY

EDITED BY

J. McKEEN CATTELL, W. CARSON RYAN, JR., AND RAYMOND WALTERS

Volume XVI | SATURDAY, SEPTEMBER 9, 1922 | Number 402

CONTENTS

Education for the Life of To-day: G. L. CAVE 281

The Use and Interpretation of Coefficients of Correlation: WALTER S. MONROE 288

The Lack of Intelligence in the Social Sciences: ALFRED P. JAMES 292

Educational Events:

The Proposed Budget for New York City Schools; Expenses of Women College Students; Oxford Students to Debate Here; Russian Professors and the Soviet Régime; An English Educator and Art Schools 294

Educational Notes and News 297

Discussion:

Teachers vs. Mental Tests as Prophets of School Progress: GARRY CLEVELAND MYERS 300

Quotation:

The Higher Education of Women 303

Educational Research and Statistics:

Scores Made by Seniors on the Hotz Algebra Scales Compared with Scores Made by High School Students Taking Algebra: CLIFFORD WOODY 303

Societies and Meetings:

Children's Bureau Conference on Problems and Standards of Employment Certificate Issuance; National Council of Teachers of English 306

$5.00 A YEAR | PUBLISHED WEEKLY | 15 CENTS A COPY

THE SCIENCE PRESS

UTICA, N. Y.—11 Liberty Street AND GARRISON, N. Y

GRAND CENTRAL TERMINAL, NEW YORK CITY

EDITORIAL COMMUNICATIONS SHOULD BE ADDRESSED TO THE EDITORS OF SCHOOL AND SOCIETY, SWARTHMORE, PA.

Entered as second-class matter November 9, 1921, at the Post Office at Utica, N. Y., under the Act of March 3, 1879.

FOR FALL USE

THE BEARD AND BAGLEY HISTORIES

A lately completed series that will solve the problems of the elementary grades.

A FIRST BOOK IN AMERICAN HISTORY

Blending the best in the social, biographical, and narrative treatment of history, this text gives an excellent general survey of American development from the age of discovery to the end of the world war. In style and organization of material, as well as in the questions and exercises following each chapter, the book is admirably suited to a first course in elementary schools.

OUR OLD WORLD BACKGROUND

The second volume in the series is world history linked to American history—a book which traces the course of European civilization in order to show what each of the many peoples that have come to our American melting-pot has contributed to the shaping of the nation—the only textbook in the field that provides so broad a view of the subject.

THE HISTORY OF THE AMERICAN PEOPLE

The aim of the text is to help students think historically: to show them the meaning of past events in their relation to the issues of the hour. To do this, the authors have followed a topical treatment and emphasized the achievements, traditions, and ideals of the nation in order to render their book not only a clearcut account of American progress, but also the best possible kind of guide to the principles of good citizenship.

AN IMPORTANT SUPPLEMENTARY TEXT

BENEZET: YOUNG PEOPLE'S HISTORY OF THE WORLD WAR

A graphic account of the great conflict—its causes, campaigns, personalities, and significance—this book meets the needs of students who were too young during the war to understand the importance and order of events. The author's vividness of style, combined with his excellent sense of perspective, makes the text especially adapted to school use.

THE MACMILLAN COMPANY

New York Boston Atlanta Dallas Chicago San Francisco

SCHOOL AND SOCIETY

Volume XVI SATURDAY, SEPTEMBER 9, 1922 Number 402

EDUCATION FOR THE LIFE OF TODAY[1]

IN his admirable chapter upon "The Evolution and Methodology of Chemistry," J. W. Mellor states: "The promulgation of immature and premature hypotheses without a substantial basis of fact is discouraged by most scientific societies." With this in mind, it would seem to be a proper function of the New Hampshire Academy of Science occasionally to admit discussions concerning rival hypotheses in education that are causing considerable worry to local school boards in the state of New Hampshire. In the determination of policy in the expenditure of public money, we of the local school boards continually have to choose between contradictory hypotheses framed by two schools, one of which vociferously presumes to be modern and scientific. In the face of the rival contenders, we are at first inclined to favor the school that brands itself as scientific; sometimes, however, we sympathize keenly with that friend of Irving Babbitt, who exclaimed that all talkers today could be classified as mossbacks and mountebanks and that as for him he preferred the mossbacks. We often have a fellow feeling for the little girl friend of Agnes Repplier, who wished that she might have lived in the reign of Charles II, because then education was much neglected. For after all, as Gilbert Murray has suggested, we of the local school boards can not argue with our constituencies; we can only feel and choose. This paper is an attempt to present the assumptions underlying the case of the "modern" school in education. The main popular hypothesis of the "modern" school was expressed by the present commissioner of education in New Hampshire in correspondence advising certain changes in the curriculum of a small high school: "We must educate for the life of to-day." If in Mellor's phraseology this hypothesis is immature and premature and without a substantial basis of fact, it ought to be discouraged by this organization.

The term, "education for the life of to-day," can best be defined after a consideration of the concrete proposals of those who use it as a slogan. Among its most ardent proponents has been David Snedden, former commissioner of education in Massachusetts and now professor of sociology in Teachers College, Columbia University. A sample of his ideas can be taken from an account given in the November number of the *Journal of Industrial and Engineering Chemistry* of a paper read by him before the Section of Chemical Education of the American Chemical Society:

> The first formal paper was read by Professor David Snedden, of Teachers College, Columbia University. Professor Snedden started out with the assumption that the present condition of the instruction in chemistry, as well as that of other science subjects in school and college, is in a very low state and that it is urgently necessary to find some remedy for the present bad situation.
>
> He suggested that the remedy might be found in a division of students of chemistry into two groups, one of which would include those who

[1] Paper read before the New Hampshire Academy of Science, at Hanover, May 27, 1922.

desired to study chemistry as a cultural subject, while the other included those who expected to follow vocations in which chemistry is of vital importance, such as farming, homemaking, mining, engineering, pharmacy, etc. Professor Snedden held that the elements of the hard or systematic chemistry need not be taught to the first group but that their needs would be met by a so-called informational course. He stated that it was becoming increasingly difficult to exact from students even of the second group the same intensive study of fundamentals which characterized student habits of a former generation. He asserted that even serious study of mathematics might soon be out of the question on account of the modern spirit which induces students to ask to be shown the utility of it all. Professor Snedden held that students and practitioners of chemistry were bad guides as to standards in teaching chemistry.

The animated discussion which followed indicated that those in attendance were opposed to the views presented. The large number of failures in freshman classes was attributed to the laxity in instruction in secondary schools. It was pointed out that it would be impossible to give adequate professional instruction to high school graduates who had not been given thorough courses in preparatory subjects. The constantly increasing attendance at high schools includes many young people who are not serious students and can not carry college courses, but such students should not be allowed to determine standards for those desiring to attend college which will result in their failure later.

The situation was stated as follows by Professor A. W. Smith, of the Case School of Applied Science:

"My criticism of the position of the high school administrators is that the whole tendency is to make the work of the high school student easy and irresponsible. The general observation of college instructors for some years past is that the high school graduates are unable to apply themselves to real work. It takes from two to three years of the college course to teach these students how to work properly. The great proportion of men dropped from college is largely due to this fact.

"The statement has been made that high school students could not be made to take any course that was difficult or of which they did not perceive the utility. This statement appears to sound so foolish that it should not be necessary to discuss it further. The idea that a high school boy is competent to select studies that will be for his best advantage in the long run seems absurd. The idea that high school students can not be required to take courses that are difficult in order to learn to apply themselves properly indicates that some different management of the high schools is desirable. If a boy of fifteen or sixteen can not be controlled by teachers or authorities, it is time other authorities were selected who could control such boys."

President Smith closed this discussion by remarking that in his young days his father would have been apt to say that if he could not carry his freshman courses without getting conditioned he had better return to the farm.

From this discussion we gather that, so far as the teaching of chemistry is concerned, education for the life of to-day demands courses with an informational tendency, and whose utility will make an immediate appeal to the intelligence of the student. We are importuned to give up our former beliefs that strong courses in mathematics should be prerequisites to advanced study in chemistry.

Thus the "modern" school voices a depreciation of those methods which represent the best judgment of two generations of teachers of chemistry, and concerning which there is an essential agreement among competent authorities in America, England and Germany. Ostwald in Germany, Mellor in England, and Alexander Smith in America have been leaders whose methods of teaching and whose textbooks have a common basis. Though differing in detail, the general assumptions are the same.

The attack of the modernists, however, has not been confined to destructive criticism of the chemistry curriculum, nor has it been launched in America alone. As early as 1890, Emperor William of Germany became a partisan of education for the life of to-day. He made several addresses whose spirit has summed up all recent utterances, though the wording is

always changed to suit local conditions. In December, 1890, he said: "It is our duty to educate young men to become young Germans and not young Greeks or Romans." Again in 1892, he stated:

> If any one enters into a discussion with these gentlemen on this point and attempts to show them that a young man ought to be prepared to some extent at least for life and its manifold problems, they will tell him that such is not the function of the school, its principal aim being the discipline or gymnastic of the mind and that if this gymnastic were properly conducted the young man would be capable of doing all that is necessary in life. I am of the opinion that we can no longer be guided by this doctrine.

In 1900 and again in 1916, the cry of the modernist was heard in Germany. The slogans were always the same. The schools were failing "to give a real preparation for the needs of modern life." They should "be replaced by a genuine German nationalistic school adapted to the needs of to-day. To devote time to subjects that do not 'function' or pay is a gross mistake. The schools should teach things and not words, realities and not tradition." Germany "now possesses the fruit and flower in her own culture and that alone." "The one aim of the schools to-day should not be formal training, but an education for life founded in moral idealism."

Among specific proposals in the secondary field were the abandonment of Latin and Greek, the reduction of emphasis on modern languages, and the limitation of the study of history to modern times.

In our state of New Hampshire since 1918, the local school boards have been dealing with many specific projects that are urged by state authorities and by individual citizens and organizations, including rotary clubs and women's clubs. The life of to-day demands a new education entirely different from the old. In my own district most radical and sweeping changes were made in the high school curriculum—changes which for the time being have been most destructive of successful educative effort, however beneficial the results may be in the future. In our high school curriculum we have seen mathematics swept out of the first two years of the senior high school. Algebra and geometry were instituted in the third year and a course written on paper for the senior year that presumes to be equivalent to a year of college mathematics. A year of English gave way to economics, and in practice English instruction has contented itself with the rapid skimming of many books rather than with enforcing the careful study of a few books. Courses in bookkeeping, typewriting and business practices have replaced the algebra and geometry for most of the male students, while courses in domestic science and appreciation of art and music attract most of the girls. The history course of the freshman year has become a hasty survey of the entire field of world history. Modern language instruction is limited to French and the emphasis therein placed on conversational French. The students have been encouraged to take courses with an alleged vocational bias.

Our seventh and eighth grades became a junior high school. We were told that the old system had no scientific basis; that it had been proved in the psychological laboratories of our universities that the age of adolescence is one unsuited to concentrated work; that at this point the imagination of the child should be fed and the hand work introduced. Hence domestic science for girls and manual training for boys were introduced. History became a system of individual reports where the student was held for a part of the lesson rather than all of it. Arithmetic gave way to concrete algebra and concrete geometry, the methods of which were so vague that the results were entirely a reflection of the personality of the teacher. Informational courses in general science were

introduced. Conversational French took the place of English grammar.

In the lower grades, so-called modern methods displaced the old. Instead of one reading book in a grade, we have a baker's dozen and they pass from hand to hand as soon as read. The superintendent runs oral reading tests and finds that our children can't read aloud. The preachment is that our little ones are required to give from one to three hours daily to fairly rigorous drill in reading, spelling and arithmetical tables. But they are also to have wonderful stories read to them; their imaginations are to be stimulated by pictures; they are to dance to phonograph music; in a word, their lives are to be enriched with "thin," "denatured," "intellectual food." From the ages of nine to twelve, the schoolroom hours are made up with tasks in arithmetic, grammar, oral composition, geography, reading and writing, all of which are so sandwiched into the program with fragments of music, drawing, hygiene, nature study, industrial arts, morals, patriotism and manners and even appreciation of art, that it is impossible for the layman to distinguish the essential from the non-essential. By the introduction of play methods, the more formal, relatively hard school training subjects are being reduced in quantity and in quality. Such is the mechanical working of the slogan of education for the life of to-day in projects that come to the attention of the local school board. (This paragraph owes much to an exposition of Sneddenism by its promoter in an article in the current volume of *The Journal of Educational Psychology*. The dark shadow of this disease hangs heavy over educational administration in New Hampshire.)

We are further advised to determine administrative policy by means of scientific educational tests. In view of the fact that the curriculum has been broadened, choices must be made for the individual student. These tests are to be the basis of vocational guidance of the individual. They are to separate out the exceptional students for better training. They are to determine the curricula to be offered to the average and are to brand a class of our future citizens as feeble-minded or morons. They are to determine the relative value of subjects in the curricula. A state-wide test has been run in New Hampshire to determine the value of Latin instruction and a few years hence the sciences may be judged in the same way.

It is my conviction that not in the period of the history of science, since the legendary days when the Taoist alchemists of China in the sixth century before Christ unsuccessfully sought for the elixir of life and the philosopher's stone, has there been a research, claiming the authority of science, whose basic hypotheses have been as questionable as those being presented today by the educational specialists who are voicing their case from the public platform. I believe that these men are reasoning from their hypotheses rather than from their facts; that in so far as their observations go, the subjective element in both observers and observed must make us accept the conclusions with greatest reserve. As Stanley Jevons stated in his "Method of Science" published in 1874: "Among uncultured observers, the tendency to remark favorable and forget unfavorable events is so great that no reliance can be placed on their supposed observations." In one of those little classics of chemistry, the Micrographia, written by Robert Hooke in 1665 and to-day available in Alembic Club Reprints because of the foresight of Alexander Smith and the other two members of the Alembic Club, the following statement is found: "The mind and the reason of the trustworthy observer must be trained to rebel against

all desire, and to disobey all inclinations." Statements of this kind could be multiplied indefinitely by a simple reference to Mellor's chapter on Methodology. According to Mach, our greatest investigator on scientific method and the exponent of the view that science is description, "the accuracy of an inference as to the nature of the objective source of a subjective sensation varies from the merest guess to virtual certainty." With what we know of the subjective difficulties that are obstacles to the path of the physical investigator, we must presume that they are multiplied in a ratio that is more than arithmetical, when we deal with the subjective sources of subjective sensation. Yet it is the fundamental hypothesis of the new education that scientific method is applicable in the field of human relationships. Against this hypothesis may be placed another, that of Emerson:

> There are two laws discrete
> Not reconciled,—
> Law for man and law for thing;
> The last builds town and fleet,
> But it runs wild and doth the man unking.

This is at least a reasonable warning to be exceedingly careful in the use of scientific hypotheses in dealing with human beings.

The second postulate of the new education is even more questionable. It is the fruit of the recent philosophic teachings of Henri Bergson in France, John Dewey in America, and Benedetto Croce, formerly Italian commissioner of education. For us who have no knowledge of the Greek tradition, it has roots in the French Revolution and can be stated in the words of Diderot, who said, "Everything is experimental in man." Bergson asserts that "life is a perpetual gushing forth of novelties." Dewey seems to believe that "education is still purely a matter of exploration and experiment," while Croce identifies history as "the creative unfolding of the world spirit." The modern who becomes enthusiastic over this postulate is due for a decided shock, if he will but read the account of Heraclitus written by Mitchell in the *Britannica*. In fact, if one were inclined to adopt the methods of the behaviorist, he might suspect the motives of our modern prophets and assert that with a knowledge of the old philosophical controversies of the past, they have adopted the extreme views that will make for their own profit. As Gilbert Murray says, "I suppose we have at the present day an extraordinary harvest of false prophets. I doubt if the Court of Ahab in its flower could compete with us." These same prophets are doing all that they can to give us a Greekless generation or two, and to discount metaphysics, "a human enterprise which William James characterized as "but the obstinate effort to think clearly." They attempt to give this postulate that "all is experimental in man" the authority of physical science. I am inclined to agree with Babbitt in his statement that "The genuine man of science . . . may also be counted upon to look with suspicion on the speculations of a Bergson." For after all no method is shown by which the hypothesis can be tested. In evaluating such a hypothesis, the man of science will remember the words of Faraday:

> The world little knows how many of the thoughts and theories which have passed through the mind of a scientific investigator have been crushed in silence and secrecy by his own severe criticism and adverse examination: that in the most successful instances not a tenth of the suggestions, the hopes, the wishes and the preliminary conclusions have been realized.

Samuel Johnson once said that nothing new could be learned in education. This view may be equally extreme, but it is a healthy one to submit at present.

A third subordinate proposition is expressed in the New Hampshire Program of Studies:

> The person who is most suitably educated under present conditions is the one who has acquired the power to respond appropriately to the largest variety of situations as they arise.

In its application this implies a depreciation of all abstract studies such as formal grammar, mathematics, Latin, Greek, and all forms of organized knowledge. Emphasis instead is placed on concrete applications and a profusion of supplementary material is used in every course. It means the discouragement of home study, because the home is not equipped with the necessary material. It means the use of school time for study, instruction, and testing of instruction. It means that the school becomes the center of outside activities, many of which take up school time. It denies the utility of persistent and dogged application to set tasks and of the systematic mastery of race experience. It claims that such training is inconsistent with initiative and originality.

In the light of an elementary knowledge of the history of science, this doctrine of variety seems to me most untenable. In chemistry it is particularly noteworthy that men such as Henry Cavendish, Michael Faraday, Edward Morley, Willard Gibbs and a host of others displayed a dogged and persistent application to set tasks both in their youth and in maturer years. Although it can not be demonstrated scientifically, I think Irving Babbitt enunciated a sounder hypothesis when he wrote, "A child has a right to be born into a cosmos and not as is coming to be more and more the case under such influences pitchforked into a chaos."

The fourth assumption of the modernist is so closely interwoven with the hypothesis of complexity that it can not be separated from it. It states that, "Self-expression is the main aim of education." It emphasizes school journalism, athletics, current events, dramatic work, school societies, and ultra-program activities. In the words of the New Hampshire program, "Teachers and pupils should regard these as vital parts of the school program." This permits the interest of the student to decide the content of the course. It allows instinct to dominate reason. The "side-shows run the circus in the main tent." Professor William H. Lloyd, of the economics department of the University of Michigan, the possessor of the mind back of the remarkable essays on "The Iron Man" of Arthur Pound, has written a letter to the *Atlantic*, whose words may be well adapted to this situation:

> If (diplomas) are handed out like buckwheat cakes at an agricultural fair, they will be just as cheap. Not for one moment should the (teacher) admit that anything is more important than his teaching. If he really feels that his subject is of less importance than dancing and pole-vaulting, for example, he is a fraud and had better seek some honest way to earn his living. . . . In taking these activities seriously, in finding here the key to culture, are we not . . . substituting for disciplined training the easy ways of amateurism.

Over against this doctrine of interest, which our state department has promoted on an alleged biological basis, is another hypothesis presented by a biologist, which agrees with our older view of education. Gilbert Murray says of it:

> My friend and colleague, Dr. Geoffrey Smith, killed on the Somme, held a view about human progress which I wish he had lived to express with the exactitude and great knowledge which belonged to him. It was, as I understood him, that in the biological or physiological sense, man had not made any advance worth speaking of since the earliest times known to us; but that our ancestors, from their arboreal days onward, stood out from all other animals by their extraordinary power of mimesis. When they met with a sort of conduct which they liked, they had the power of imitating it, and of course also the power of selecting for imitation the particular elements in it that appealed to them most."

In my opinion we need emphasis on imitation of the core of experience of the race

in the younger years more than a worship of the creative instinct of the child.

This view that education should concern itself so strenuously with the gratification of the desires and impulses of the moment and should be determined wholly by environment was put forth by Rousseau in his *Emile* and was combatted by Emanuel Kant with an equally extreme hypothesis, but one that can be urged to-day without danger.

"The most necessary element in education, according to Kant, is constraint, which by the formation of habit prepares the young to receive as principles of conduct the laws at first imposed upon them from without." In practice Kant, "though kind to his students, refused to remit their fees, as this, he thought, would discourage independence."

The modernist replies that he does stress habit. Analyzed through, his fifth assumption amounts to this: "The young should acquire habits that make for material efficiency." This is what Arthur Pound calls, "education for production." It is the hypothesis back of the movements for vocational training, which are causing our New Hampshire school boards a great deal of worry. In this state, an admittedly middle ground has been chosen by the state department. The courses are general, but the project methods proposed seem to imply a transfer of training—a hypothesis that has been most scornfully treated when vouchsafed by the defenders of the traditional subjects. There is undoubtedly a motivation of interest in making toboggans and skis. But a price is being paid in that time is taken from the training of the mind along abstract lines and administrators are inclined to condone lapses in other subjects, if interest and facility are displayed in practical arts. The conservative mind rebels against the movement because it seems a compromise with the extremists, who would train for definite trades and narrow the opportunities of the student even more. It seems like driving an irrevocable wedge at an early age into the careers of those who might later prove capable of college or professional school. As presented by extremists like Snedden, it tends to make the public educational system subsidiary to industry. This hypothesis is urged as being democratic. If, however, we assume with Gilbert Murray that "the cardinal doctrine (of democracy) is the right of every human soul to enter, unhindered except by the limitation of its own powers and desires, into the full spiritual heritage of the race," we are inclined to ask with Arthur Pound, "why waste time teaching children how to work, when their chief need is to know how to live?"

The modern, however, is aware of these misgivings. He does not wish to put the choice of a vocational course on the child. He would have science make the choice for him. We have had, in the course of our history, Calvinistic determinism claiming the authority of God and an economic determinism claiming the authority of science. The sixth assumption is: "Scientific intelligence tests can be used to select at an early age those who are to be the future leaders of the nation." This hypothesis received a sanction in the army, where it was necessary to select with speed men to learn new tasks. The course then had a pragmatic justification. But it is wise to see the steps in reasoning. Binet after a long period of trial and error struck upon the idea of using age for a standard of intelligence. Then he developed a series of tests which could be passed by an arbitrary number of pupils in 100. These tests were improved by Terman and others. What they measure, Terman confessed his inability to define, but he called

it acquired intelligence. Then, by a cerebral process, he assumed that acquired intelligence is proportional to native intelligence. Then native intelligence, we are told, is an absolute measure of the intellectual education that should be provided. This line of reasoning reminds one of Horace Mann's faith in phrenology and its predictions have as much scientific foundation.

In conclusion, the case of the modernist is built upon uses of hypotheses that have not been known before in the history of physical science. He has attempted to found his authority upon science. The hypotheses involved are not subject to scientific verification. Rather they are extremes that have been found in all ages during the recorded history of philosophy. Education, in my opinion, must go on using the methods of rational empiricism. I am inclined to believe on experiential grounds that our professional societies have been right in their expressions to the effect that a firm grounding in the humanities and an adequately substantial scientific training should precede technical specialization for any purpose. In this connection it may be well to emphasize the fact that this is the view taken in the recent report of the American Institute of Chemical Engineers.

In answer to Snedden's specific plea for informational chemistry it may be well to quote Karl Pearson: "What we want are trained brains . . . and not a knowledge of facts and processes crammed into a wider range of unskilled minds." I have no fear but our civilization can absorb all the trained minds that our public school system can furnish. I do fear that it can not absorb the graduates of the schools advocated by our fatalistic modernist friends, who have lost confidence in the training of minds.

G. L. CAVE

SCHOOL BOARD,
GORHAM, NEW HAMPSHIRE

THE USE AND INTERPRETATION OF COEFFICIENTS OF CORRELATION

WITHIN the last few years the statistical device known as the coefficient of correlation has become extensively used in educational research for summarizing the relation existing between two sets of paired facts, such as the scores obtained from two applications of a test to the same pupils, or the scores yielded by two different tests. As a result, its interpretation has become a matter of major importance.

There are two conditions which need to be considered in interpreting a coefficient of correlation. In the first place, the magnitude of the coefficient of correlation is likely to be affected by the selection of the population from which it was calculated. When studying relationships whose application is general, it is obvious that we must resort to sampling. For example, if we wish to ascertain the relation between success in Latin and success in English, it is necessary for us to answer this question on the basis of the relation that exists between these two achievements in a limited population. It is generally recognized that, if two populations are selected in a random or unbiased manner, the resulting coefficients will not be identical except by chance. The differences, however, will not generally be large, and, if we are justified in assuming that the selections are random, the fluctuations of the resulting coefficients of correlation conform to a general law. For any given value of the coefficient of correlation calculated from a known number of cases we can determine the probable error by means of the well known formula,

$$\text{P.E.}_{r_{12}} = .6745\frac{1 - r_{12}^2}{\sqrt{n}}$$

The meaning of the probable error of the coefficient of correlation may be illustrated as follows: If a coefficient of .20 has been obtained from a correlation table based on

36 cases, *i. e.*, 36 pairs of facts, the probable error of this coefficient of correlation is ±.11. This means that the chances are 1 to 1 that the true coefficient lies between .09 and .31. The chances are 4.5 to 1 that it lies between —.02 and .42. The chances are 21 to 1 that it lies between —.13 and .53. It is obvious that we are not justified in asserting that the true coefficient of correlation, i. e., the one calculated from *all* of the pairs of facts, or the average of the coefficients calculated from a large number of collection of 30 pairs of facts, is positive. Therefore, a coefficient of correlation of .20 with a probable error of ±.11 can not be considered proof that a relationship exists between the two traits. Although the calculated coefficient is positive, the probable error is so large in comparison with the coefficient of correlation that it is not altogether certain that the true coefficient would be positive. For this reason, it is necessary to require that the coefficient be several times larger than its probable error before it is interpreted as proving the existence of a relationship.

Authorities differ with reference to the ratio which must exist between the coefficient of correlation and its probable error before the existence of a relationship can be asserted. By at least one writer, the ratio is placed at 6. Another writer places it as low as 2 or 3. A conservative rule is that the coefficient must be four times its probable error before the existence of a relationship can be assumed. The larger the coefficient of correlation, the more marked is the relationship. For the relation of achievement of one school subject to that of another school subject many of the coefficients of correlation range from .20 to .40. Thus, .50 is considered to indicate a high degree of correlation for these two traits. This only means that .50 is larger than most of the coefficients of correlation obtained in the study of the relationship existing between achievement in different school subjects. In the study of the reliability of educational tests, coefficients of correlation from .60 to .75 are most frequent. Hence, for this relationship .85 is considered high and .50 is low.

In certain types of educational research the magnitude of the coefficient of correlation is affected also in other ways by the selection of the population group from which it is calculated. In the case of certain traits, the range of the magnitude of the traits is a potent factor in determining the magnitude of the coefficient of correlation. For example, if we are studying the relation between intelligence and achievement in silent reading, the coefficient of correlation will be much smaller when calculated from a random selection of the pupils belonging to a single half grade than when it is calculated from a random selection of pupils taken from grades three to eight, inclusive. In a recent study the writer calculated separately the coefficient of correlation between these two traits for each half grade from III-B to VIII-A, inclusive. The coefficients of correlation ranged from —.12 to .57. Since there were from 200 to 400 cases in each half grade the probable errors of these coefficients of correlation due to sampling are relatively small. When the data from all grades were combined the coefficient of correlation for the same two traits was found to be .76. This is distinctly larger than the highest coefficient of correlation for the separate half grades.

A more striking illustration is obtained from the correlation between chronological age and mental age. In the investigation referred to above the coefficients of correlation were calculated between these two traits for each half grade group. These ranged from —.12 up to —.44. In other words, the correlation between mental age and chronological age for the pupils be-

longing to a single half grade is inverse. In general, in a given school grade the pupils who are older chronologically tend to be the ones who are younger mentally, and vice versa. When data for the pupils from grades III-B to VIII-A, inclusive, were grouped together the correlation between chronological age and mental age was found to be .56. In this instance the coefficient is not only larger numerically but also positive, although when the data were taken by separate half grades all of the coefficients were negative.

It does not always happen, however, that the coefficient of correlation is affected by the grade range from which the population is selected. For the same pupils the coefficient of correlation was calculated between the intelligence quotient (I. Q.) and the achievement quotient (A. Q.) for arithmetic.[1] When the data were taken separately by half grades, these coefficients ranged from —.19 to —.62. When the data for all grades were taken together the coefficient of correlation was found to be —.41, which is approximately the average of the coefficients of correlation for the separate half grades.

It is, therefore, necessary to take into account both the type of selection made as well as its random character. It is not enough to make the selection of data in an unbiased way. In addition one must interpret the coefficient of correlation that is obtained with reference to the particular type of selection that has been followed. If the data have been obtained from the pupils belonging to a given half grade, the interpretation will be generally on a distinctly different basis from that to be followed if the data were selected in a random way from the pupils belonging to a sequence of several grades However, as noted above, there may be exceptions.

My second thesis is that the meaning to be attached to a given numerical value of a coefficient of correlation depends upon the type of relationship being studied.

For example, if we were studying the relation between general intelligence and quality of handwriting, a coefficient of correlation between these two traits of .40 would be high. If we were to obtain this result for a representative student population drawn from the sequence of several grades, we would be justified in asserting that for this group the relationship between general intelligence and quality of handwriting was very high. On the other hand, if we were studying the relation between first trial and second trial scores on an intelligence test, we would consider a coefficient of .40 exceedingly low, if it was based upon a representative group of pupils from a sequence of several grades. In order for a coefficient of correlation to be considered high in this case it would need to be .80 or larger.

When these two illustrations are analyzed with reference to the questions we are attempting to answer by means of the coefficient of correlation we find that we are dealing with questions which are not identical. In the case of the relationship between general intelligence and handwriting we are primarily concerned with ascertaining whether or not any relationship exists. If any does exist, it is relatively small. It we secure a positive coefficient of correlation which is more than three or four times its probable error, we have evidence of a positive relationship between these two traits. We are, of course, interested somewhat in the closeness of this relationship but since it is slight we have answered the question in

[1] Monroe, Walter S.: "The Illinois Examination," *University of Illinois Bulletin*, Vol. 19, No. 9. *Bureau of Educational Research Bulletin*, No. 6. Urbana: University of Illinois, 1921. Pp. 70.

so far as we are able when we have determined that a positive relationship does exist. On the other hand, when we are dealing with the relation between first trial scores and second trial scores on the same test, we are not concerned with ascertaining whether a positive relationship exists between these two sets of facts. We know from our general experience with educational tests that a relatively high positive relationship exists between first and second trial scores. The question which we wish to answer in this case is how nearly perfect is this relationship, or perhaps to put it into a more effective form, how great are the departures from a perfect relationship. If we compare the coefficient of correlation with its probable error we obtain little or no assistance in interpreting it in such a case. For example, we might have a coefficient of correlation of .65 with a probable error of $\pm$.03. In this case the coefficient of correlation is more than 20 times its probable error but the relationship between the first trial scores and the second trial scores is far from perfect.

In order to secure a measure of departure from a perfect correlation the probable error of estimate has been proposed for use instead of the coefficient of correlation. It may be calculated by means of the formula,

$$\text{P.E.}_{\text{Est}} = .6745\sigma\sqrt{1 - r_{12}^2}$$

The calculation of the probable error of estimate, if the coefficient of correlation and the standard deviation (σ) are known, involves only very simple arithmetic. It gives a measure of the magnitude of the departures from perfect correlation, or to put it in another way, it measures the amount of change which would be necessary in one set of data in order to bring it into perfect correlation with the other. For example, the correlation between the number of questions answered by eighty fourth grade children on forms 1 and 3 of the Courtis Silent Reading Test No. 2, was found to be .87 $\pm$ .02. In this case the coefficient of correlation is 43 times its probable error. This will be recognized as a very high correlation since it is based upon data from children in a single school grade. The probable error of estimate is 4.6. This means that in fifty per cent. of the cases one set of scores departs from perfect correlation with the other by more than 4.6 units. Since the average score is approximately 40 this amounts to about twelve per cent. of the magnitude of the average score.

In the formula for the probable error of estimate it will be noted that its magnitude depends upon the standard deviation of the distribution of the data from which the coefficient of correlation is computed as well as upon the coefficient of correlation. For this reason there is far from perfect correspondence between the magnitude of the probable error of estimate and the magnitude of the coefficient of correlation, even when the difference in the size of units is recognized by taking the ratio of the probable error of estimate to the average. For example, a certain collection of paired facts yielded a coefficient of correlation of .52. The probable error of estimate was 6.4 and the ratio of this to the average was .33. Another collection of data yielded a coefficient of correlation of .80, a probable error of estimate of 1.4, and the ratio of the probable error of estimate to the average of .14. A third collection of data yielded a coefficient of .51, a probable error of estimate of 17.6, and a ratio of .37. It will, therefore, be seen that widely different probable errors of estimate may be obtained for coefficients of correlation of approximately the same magnitude.

By means of the formula given for the probable error of estimate we may calculate for any value of r_{12} the factor by

which the standard deviation is to be multiplied in obtaining this measure of departure from perfect correlation. This factor we may call for convenience the "coefficient of probable error of estimate." In the accompanying table these "coefficients are given for value of r_{12} ranging from .00 to .99. To find the probable error of estimate for a given value of r it is only necessary to multiply the standard deviation by the appropriate coefficient.

This table helps us to realize the significance of the coefficient of correlation when considered as a measure of departure from perfect correlation or agreement. The coefficient of correlation of .65 is considered high in some cases, yet we find by means of this table that in the case of fifty per cent. of pairs of values there is a departure from perfect correlation which equals or exceeds .5126 of the standard deviation of the set of measures being considered. In fact, for coefficients of correlation of .90 or higher the probable error of estimate is shown to be relatively large. Thus, from the standpoint of departures from perfect correlation it is clear that values of r_{12}, which we have been accustomed to interpret as indicating a "high correlation," are really indicative of departures from perfect correlations so large that it becomes necessary to revise our concept of "high correlation."

The moral of this article is that we must become more discriminating in our use of the statistical device known as the coefficient of correlation. We must remember that its magnitude is affected by a variety of conditions, and we must furthermore bear in mind the type of use which we make of it in a particular case. When we are interested in securing a measure of the departure from perfect correlation is it recommended that the probable error of estimate be used instead.

Coefficient of correlation, r_{12}	Coefficient of probable error of estimate
.00	.6745
.05	.6736
.10	.6711
.15	.6669
.20	.6609
.25	.6531
.30	.6434
.35	.6306
.40	.6182
.45	.6023
.50	.5841
.55	.5634
.60	.5396
.65	.5126
.70	.4817
.75	.4461
.80	.4047
.85	.3553
.90	.2940
.92	.2643
.94	.2301
.95	.2106
.96	.1889
.97	.1638
.98	.1342
.99	.0952

WALTER S. MONROE
UNIVERSITY OF ILLINOIS

THE LACK OF INTELLIGENCE IN THE SOCIAL SCIENCES

A well-known writer in a recent book that has attracted much attention laments the lack of *intelligence*, that is to say *creative thought*, elsewhere than in the sciences dealing with material nature. In particular the absence of creative thought in the social sciences is asserted and deeply deplored. One might easily display some of this deplored lack of intelligence by endeavoring to question or refute the viewpoint. It seems, however, more worth while to accept it and try to account in some way for the condition with the hope of hitting upon some of the many remedies that probably exist.

In the accounting very likely the major

reason, as is ably suggested in the book, is to be found in inhibitions, mainly inherited and indirect but often due to social and economic considerations of a more direct nature. The social scientist not only does not, but can not, except in rare cases and rare circumstances, handle his facts and make his conclusions in the manner of the scientist dealing with the material elements of the universe. But, all this fully acknowledged, there are other reasons. One of these is the quantity and quality of instruction in the social sciences given in schools.

In spite of the tremendous influence of books, magazines and newspapers, it is fairly safe to say that the educational system is primarily the source of the intellectual ideas and practices of the ordinary individual. The defect must then be in the educational system.

A survey of the educational system will reveal in turn that, save in methodology and possibly in adaptations to local needs, the conceptions of teachers and pupils in elementary schools are those in vogue in secondary schools and normal schools of the time. In turn the conceptions and practices of secondary school teachers and pupils and, in many cases, of normal schools teachers and pupils, again save in methodology and possibly in adaptations to local needs, are those of the undergraduate school whether of the small college type or of the type of the various undergraduate schools of the average university. From the undergraduate school thus go out influences which in spite of other factors dominate the whole lower educational system. The crux of the matter under discussion is in the undergraduate school. Conditions in the undergraduate school are in a large degree the determining factor. Theoretically, it is true, the graduate schools and schools of education bring influences to bear upon the undergraduate school. Actually these influences are offset by conditions which render them of little avail. The ideas and practices of the graduate school and school of education can not be maintained by the average instructors in the average undergraduate school teaching a field such as the social sciences. Once a vivid dream of possibilities, these ideas and practices soon become a distant vision and merely survive to furnish material for feeble and vain protests. Probably no part of the entire educational system of the United States is more in need of observation and reform than the undergraduate school granting the bachelor's degree.

Since the lack of *intelligence* in the social sciences is the matter directly under consideration it is necessary to confine attention to defects in the undergraduate school as regards these subjects. Others can pursue the matter further in additional fields.

The important fact is that the average undergraduate is not getting in the social sciences the quantity and quality of instruction and training to which he is fully entitled. Many courses for his benefit may be offered in the social sciences. Undergraduates may indeed be taking too many hours work in the social sciences. They may be taking too many courses in these fields, as is sometimes asserted. But they are not getting individually the quantity of attention and the quality of instruction and guidance which is necessary to inculcate and spread the conception and practice of *intelligence* in matters of social fact. One explanation of this is that the attention of educational administrations is too often, in the social sciences, and possibly elsewhere in the curriculum, focussed upon the instructor rather than upon the student. The number of classes taught by the instructor, the number of hours spent by him in the class room, the number of

students on his class roll are matters of concern. The situation of the individual student in the social sciences is not, however, closely observed and carefully considered.

The most clearly demonstrable proof of this fact is that the student does not get in the social sciences the instruction which, in many cases, he actually pays for. Altogether too often he pays a dollar for fifty cents worth of instruction. In the case of schools relying mainly upon tuition fees for support this is palpable to anyone with any mathematical ability. On investigation it will be found that in the case of schools relying only to the extent of 50 per cent. upon tuition fees in the social sciences taken in by an institution are from 50 to 100 per cent. greater than the amount actually spent upon the instruction given in the social sciences. If, as may be reasonably claimed, the endowment, not specifically assigned, or public support enjoyed by an educational institution is as much for training in the social sciences as for anything else, the situation is still more grievous, and only 25 to 50 per cent. of the money going into the treasury for instruction in the social sciences is expended for that purpose.

Educational administration at present is an extraordinarily complex and difficult matter. Theories and principles are not easily met under present conditions. The demands upon the treasury of the average educational institutions are many and heavy. Time and opportunity are hardly available for a searching analysis of the sources of its revenue and a reorganization of its expenditures in accordance with the intention of those who provide the money. Yet this is exactly what must be done in the future. It can not be permanently overlooked that threads of expectation and purpose run into and out of the treasuries of the entire educational system. In the case of endowed institutions the determining factor, it would seem, might well be the wishes of those who furnished the endowment. In the case of institutions depending upon tuition fees for support, the wishes and purposes of those paying the tuition would seem to be a criterion.

If in the American undergraduate schools a dollar's worth of guidance, attention and instruction were given for the dollar paid in for or supplied for instruction in the social sciences, a veritable revolution in education in these fields would appear. The laboratory method lying back of the *intelligence* found in the material sciences could be at least partially adopted.

As it is at present, in the specialization which is characteristic even of the undergraduate school, students specializing in the social sciences pay in part for the education of others specializing elsewhere. The world complacently remarks that somehow they have gotten less, an easily deductible as well as an easily observable fact. Specialists in the natural sciences, engineers of all kinds, and medical students in particular are literally getting their education at the partial expense of others studying and specializing in other fields of knowledge and endeavor. Until this condition is remedied improvement is relatively impossible and the lack of *intelligence* in the social sciences, so lamented, will continue to exist.

Alfred P. James
University of Pittsburgh

EDUCATIONAL EVENTS

PROPOSED BUDGET FOR NEW YORK CITY SCHOOLS

The Board of Education of New York City has transmitted to the Board of Estimate its budget for the expenditure in 1922-23 of $95,007,766 for school needs of the city, an

increase of $4,733,783 over the budget of last year.

The new figures represent the result of months of consideration and pruning from a total of $102,000,000 and were adopted by unanimous vote. If the Board of Estimate grants the budget, the school board will not find it necessary to ask for additional funds during the year, according to Mr. Arthur S. Somers, chairman of the budget committee.

Continuation schools will be continued as at present. The rapid increase of pupils in these schools, however, is giving the authorities considerable worry. An enrollment of 30,000 is expected by January and 40,000 by the next fall.

Mr. Somers was of the opinion that the statute concerning continuation schools should be modified. Employers, he said, do not care to employ children attending these schools as they realize the children are obliged to spend certain hours every day in study. The present attendance in the continuation schools is 18,900 and the 61 attendance officers are unable to handle the work involved in looking after that number.

At the meeting of the Board of Education last week an additional $105,000 was voted to increase salaries in the administrative and clerical force, to pay for examiners who will be constantly on duty and to provide for the position of assistant secretary to the board.

EXPENSES OF WOMEN COLLEGE STUDENTS

THE American Association of University Women has just published a survey of 114 colleges and universities on "The Expenses of Women College Students," compiled by Helen Tredway Graham, Carol Munroe Sheldon, Norma E. Burgee and Mary Relihan Brown. The survey was prepared under the auspices of the Education Committee of the College Club of St. Louis.

Large and small women's colleges and co-educational universities and colleges throughout the United States, and two Canadian universities are included, satisfactory responses being received from 114 out of 170 institutions to which questionnaires were sent.

Tables are given for individual institutions on the A. A. U. W. list and also of expenses in summary form.

Conclusions are stated as follows:

1. The average "catalog expense" (tuition, room and board, and fixed fees) tends to be high at large private institutions, particularly in the east, and low at small private institutions, and, for residents of the state, at state universities. . . . For the institutions for which a figure for average "catalog expense" is given in the table, the mean average is $486.04 (minimum, $265, and maximum, $1,009.43).

2. The average "extra-catalog expense" (books and supplies, dues, contributions, recreation and incidentals) tends to be high at large institutions, and low at small ones; and this statement applies alike to private and state institutions. It is likely to be particularly high at co-educational universities. . . . For the institutions for which average budget figures for "extra-catalog expense" are given in the table, the average is $160.25.

3. The grand total annual expense (minus clothing and railroad fare) is high at large private institutions and low at small institutions, whether private or state. The low "cataog expense" and high "extra-catalog expense" at large state universities result in a total annual expense not far from the mean average. . . . For the institutions for which average budget grand totals are given in the table, the average annual expense (excluding the cost of clothing and railroad fare) is $577.05.

4. The cost of clothing is probably on the whole about the same at college as at home.

5. The increased cost of attending college in recent years would seem to be caused more by the undoubted increase in "catalog expense," than by the increase in "extra-catalog expense."

OXFORD STUDENTS TO DEBATE HERE

REPRESENTATIVES of the Oxford Union, the debating society of the University of Oxford, will come to the United States shortly for a series of debates with Eastern colleges. Their itinerary opens at Lewiston, Me., on September 26, where they will meet the Bates College team which went to England for a debate with Oxford last year. They will then go to Swarthmore, Pa., to meet the Swarthmore College team on October 2. Debates follow with New York University on October 4, with Yale University on October 6 and with Harvard University on October 9. Dates with Princeton,

Columbia and Cornell are pending.

The questions proposed for discussion relate to the League of Nations and Trade Unionism. These two subjects, to quote a letter of R. M. Carson, an American Rhodes scholar who is now president of the Oxford Union, "are the ones on which English and American thought show the most instructive differences."

The English style of debate will be followed. This style is less formal than the American, each speaker addressing himself to any phase of the general subject without premeditated assignment of arguments. The audience votes the decision.

A unique feature of the debates on this tour will be that two Englishmen and one American will form one side, to be opposed by two Americans and one Englishman.

The Oxford debaters are E. Marjoribanks, of Christ Church, K. M. Lindsay, of Worcester College, and M. C. Hollis, of Balliol. Politically, one is a member of the Labor Party, one a Liberal, and one a Conservative.

RUSSIAN PROFESSORS AND THE SOVIET RÉGIME

AN Associated Press correspondent, writing from Moscow following a recent interview with Commissar of Justice Kurski, reported that 1,500 intellectuals, including professors in the Universities of Moscow and Petrograd, have been ordered exiled as a mild form of punishment.

Many of those banished had long sought the opportunity to leave Russia and were pleased with the decision. Others pleaded to be allowed to remain. This, however, was refused, except in one instance where, according to Kurski, a Professor Shepkin said he would rather die than leave Russia. He was permitted to stay.

"Reestablishment of the economic state of affairs throughout Russia makes it absolutely necessary to stamp out any underground or counter revolutionary activity against the Soviet régime, which is carried on by certain intellectuals in universities and organizations of professional men," Kurski said.

"We gave all these people a fair chance, and, if during the five years of the Soviet régime they have been unable to reconcile themselves to us, then no hope can be entertained of their reconciliation. Nothing can be expected from them in the way of helping us."

The banishment decree followed closely the Communist Party Congress, at which Zinoviev declared the new economic policy had revived in the bourgeoisie a feeling dangerous to the Soviet government.

Among the exiles is Professor Mannilov, who was minister of education under Kerensky.

AN ENGLISH EDUCATOR AND ART SCHOOLS

MR. H. A. L. FISHER, president of the English Board of Education, recently gave an address in London that contained references to schools of art which are of interest in connection with the interview of Mr. C. R. W. Nevinson, the artist, on the same subject, reported in last week's issue of SCHOOL AND SOCIETY.

Mr. Fisher defined the two-fold purpose of schools of art as being: "first, to equip with the needful measure of accomplishment the teachers who give art instruction in our schools, and secondly, to train men and women to earn their livelihood in one of the artistic professions."

A school of art frequented only by intending art teachers and instructed only by those who have nothing else to do will have to struggle hard to escape petrification; but if, in addition to the students who are designed for the teaching profession there are others who have sufficient confidence in themselves and in their art to take their talents into the open market and to confront the April weather of an artistic life—if, that is to say, in addition to the students who propose for themselves the modest and limited aim of teaching in schools, there are those who draw no such boundary round their ambitions—then there is a seed of life and buoyancy in the school which should preserve it against the dangers of dullness and decay.

Mr. Fisher went on to say that "there is nothing new or peculiar to art schools in this contention." He declared:

One of the main arguments for the development of training departments at our universities is that it throws the prospective teacher into the general whirlpool of academic life and enables him to mix freely with contemporaries who are preparing themselves for other callings. But for

the art teacher, this opportunity of intercourse with art workers of every description is of incomparable value, for without it he might lose sight of the fact that he, too, within the measure of his faculties, should consider himself to be artist as well as teacher, and realize that he will gain in power and impressiveness as a teacher in proportion as he perfects himself in his art.

Mr. Fisher dwelt upon the conditions of the public taste in England and declared that the improvement of public taste "is a new task for the art schools."

Let our art schools be few and strong rather than many and weak. Let them influence the public bodies and the industries in their respective areas. Let some, at least, of those who teach in them be employed half time, and otherwise engaged as creative artists in their respective departments . . . so that a close touch may be kept with the needs of industry, and a quickening impulse from the outside world may be communicated to work in the school.

Mr. Fisher added:

Every writer who has made a serious contribution to pedagogical literature recognizes that art must have a place in a well-balanced scheme of education. . . . A school which does not endeavor to convey the idea of beauty, in some, at least, of its teaching, even if it be only in the comparatively humble but most important sphere of handwriting, is failing in at least one third of its mission.

EDUCATIONAL NOTES AND NEWS

Dr. William F. G. Swann, professor of physics in the University of Minnesota, has been appointed professor of physics in the University of Chicago. Before coming to the United States in 1913, Professor Swann taught at the Royal College of Science, London, and the University of Sheffield. Up to 1919, when he went to Minnesota, he was with the Carnegie Institution, Washington, D. C.

Miss Bertha K. Whipple, assistant professor of home economics in the University of Missouri, has sailed for Constantinople, where she will spend a year in the American Hospital as dietitian and will also give instruction to a class of 25 nurses, representing nine nationalities.

Grover H. Alderman, superintendent of schools at Newton, Iowa, has been appointed associate professor of elementary education at Indiana University.

Weston E. Fuller, of the engineering firm of Hazen, Whipple and Fuller, New York, has been appointed professor of civil engineering at Swarthmore College. Professor Fuller is a C.E. graduate of Cornell University, class of 1900, and was for a time an instructor there in civil engineering.

Dr. William A. Dunning, professor of history and political philosophy at Columbia University, died in his sleep on the night of August 25, having suffered from heart disease since February 13 last, when he was seized with a severe attack after delivering a lecture. He was in his sixty-fourth year. Graduated from Columbia in 1881, he took his master's and doctor's degrees there, and in 1886 joined the teaching staff. In 1904 he was appointed Lieber professor of history and political philosophy, receiving from Columbia at the same time the honorary degree, LL.D. He was president of the American History Association in 1913. His "History of Political Theories" was completed two years ago.

Miss Anna J. Bradley, formerly of the Misses Bradley's School, Back Bay, Boston, and also an instructor in the Framingham Normal School, died at Belmont, Mass., on August 24, as the result of injuries in a bicycle accident on August 9.

Miss Edna M. Cobb and Miss M. Eleanor Jackson have been appointed to the staff of home economics specialists of the College of Agriculture of the University of Maine.

An Associated Press dispatch from Fairbanks, Alaska, reports that everything is in readiness for the opening on September 18 of the farthest north college on this continent, the Alaska Agricultural College and School of Mines.

Dean Rollin D. Salisbury, of the University of Chicago, who died on August 15, bequeathed to the university what is announced as "a large fund for the endowment of scientific fellowships." Dr. Salisbury had been dean of the Ogden Graduate School of Science for more than twenty years, head of the department of geography for sixteen years, and, at

the time of his death, was head of the department of geology.

By the will of the late Frederick Bertuch, of New York City, Columbia University will receive $100,000 "to be used at the discretion of the board of trustees in assisting impecunious students to enable them to pursue courses of study in any department of the university." Other bequests are: Cooper Union, $50,000; Wartburg Farm School of the Evangelical Lutheran Church, $10,000.

Yale University will receive $100,000 by the will of William Sloane, a New York merchant, whose bequests to public institutions amount to about $600,000.

The Larksville high school, near Wilkes-Barre, Pa., a three-story structure with accommodations for 600 children, practically was destroyed on August 26 by a mine cave that engulfed it to a depth of 20 feet. The building toppled slightly forward as it subsided. It was valued at $250,000.

Miss Marjorie Barker, of Michigan City, Ind., has filed a suit for $50,000 damages against Bryn Mawr College as a result of her dismissal from that institution. Last February a suit to force the college to reinstate her as a student was dismissed by the Montgomery County Court because, the court held, it had no jurisdiction in the case. Miss Barker names the college and its former president, Miss M. Carey Thomas, as defendants. The damages asked are for what Miss Barker claims to have been her unjust expulsion on April 2, 1921, on suspicion of petty thefts from the rooms of other students.

More than fifty army officers on active duty at colleges, universities, high schools and other educational institutions throughout the country were relieved August 31 of their assignments "and from further active duty" in the army. The wholesale retirement of these instructors, it was said, had become necessary because of reduced appropriations authorized by Congress for the fiscal year ending June 30, 1923. It is the War Department's intention, it was said, to replace the instructors with officers on the active duty status. They will be taken from the 10,300 officers remaining in the regular establishment when the commissioned personnel has been reduced in accordance with congressional acts. Among the various institutions affected by the removal of present instructors are the University of California, San Francisco and Los Angeles high schools, Oregon Agricultural College, University of Pennsylvania, Western Maryland College, Sewanee Military Academy, Tennesse, University of Georgia, University of Minnesota, State University of Iowa, University of Kentucky, and high schools at Cleveland, O.; Louisville, Ky., Chicago, Detroit and Grand Rapids, Mich., Indianapolis, Ind., Birmingham, Ala., Nashville and Memphis, Tenn., and others.

Mr. W. George Myers, of Milwaukee, Wis., a delegate to the convention of the International Association of Printing House Craftsmen, held in Boston last week, charged, in a talk from the floor, that many teachers of printing in the public schools throughout the United States are utterly incompetent to fill such positions and that oftentimes the equipment furnished the printing classes is out of date or inadequate. Mr. Myers urged the delegates to the convention to go home determined to see that their local school boards and committees shall pay proper attention to the equipment of the printing departments in the public schools and that competent printers are employed as instructors.

A dispatch from Yokohama in the New York *Evening Post* reports that the Foreign School of Yokohama, which, unlike other similar schools of Japan, has rigidly excluded children of mixed marriages, has at last decided to lift the ban. This is the result of a long controversy in which western merchants of Japan have been opposed by men with Eurasian families. The lack of money broke down the opposition to these children.

One hundred public schools in New York City will have to close in October unless they receive adequate supplies of coal, Patrick Jones, superintendent of supplies of the Board of Education, stated recently. Mr. Jones in emphasizing his plea that immediate attention be given to the existing conditions said that if the schools were forced to close because of lack of fuel 100,000 children would be prevent-

ed from pursuing their studies, and if the transportation system of the city were shut down because of lack of coal 150,000 additional children would be kept out of school.

CONTRIBUTIONS of scientific literature for distribution among the scientific men of Russia are still being received by the American Committee for the Aid of Russian Scientists, headed by Dr. Vernon Kellogg, of Washington, D. C. Reports of American scientific men, who have recently visited Russia, go to show that the lack of food has not been the only cross which the Russian savants have had to bear. Lack of current literature and new treatises on the sciences has caused them to lose step with the outside scientific world almost entirely. The American Committee for Aid of Russian Scientists has arranged with the American Relief Administration, of which Herbert Hoover is chairman, to forward these contributions to Russia, to be distributed there by a Russian committee, cooperating with the A. R. A. The American Relief Administration has appointed W. E. Gertzen & Co., custom house brokers, 70 West Street, New York, to receive contributions. Many hundreds of journals and books have already been shipped by the A. R. A.

THE triennial council of Phi Beta Kappa will be held September 11 to 13 at Cleveland, Ohio. Cleveland was chosen because this year marks the seventy-fifth anniversary of the founding of the Alpha of Ohio of Phi Beta Kappa at Western Reserve College in Hudson, Ohio. The Alpha of Ohio now has two divisions, that of Adelbert College and of the College for Women of Western Reserve University. Dr. Charles F. Thwing, president emeritus of Western Reserve, is the oldest living senator of the fraternity. At the banquet for visiting delegates and for all Phi Beta Kappa men and women of Northern Ohio, Dr. Albert Shaw, editor of *Review of Reviews*, will be the principal speaker, and addresses will also be given by Dr. Thwing and Dr. Oscar M. Voorhees, general secretary of the fraternity.

THE report of Mr. Edward G. Zimmer, the commissioner appointed by Governor Miller, of New York, to investigate charges of misuse of funds and inefficiency at the State Institute of Applied Agriculture at Farmingdale, L. I., was made public September 1. It recommends that a new director be appointed, because the morale of the school has been destroyed under the present administration, and suggests that all schools of this kind be brought under a state board or commission, because the trustees are unable to give enough time to supervision and are usually unskilled in educational fields. The trustees have until September 11 to answer to Governor Miller the charges against them.

BIRMINGHAM SOUTHERN COLLEGE has established a law course, with Judge Hugh Locke as dean. O. C. Carmichael, director of the summer school of the college, has become dean of the Alabama Technical Institute and College for Women.

MR. H. N. P. SLOMAN, of Rugby School, England, has been appointed headmaster of Tonbridge School.

THE vice-chancellor of London University for 1922-23 is Mr. H. J. Waring, F.R.C.S., who has been dean of the faculty of medicine.

MR. JOHN HENRY NICHOLSON, assistant lecturer in education in the University of Bristol, England, has been elected to the Albert Kahn Traveling Fellowship, which is of the value of £1,000. He is 32 years of age, and had a distinguished career at Oxford, where he gained first class in the Honour School of Modern History and first class in the Honour School of Theology. He was rejected on medical grounds for military service twice, but succeeded in enlisting in 1915, and was subsequently awarded the Military Medal for gallantry in the field. These fellowships were founded in 1910 through the generosity of M. Albert Kahn, of Paris. Candidates must be of British nationality, and have passed the examinations required for a degree in some university in the United Kingdom. Women as well as men are eligible for election. The itinerary includes the principal states of Europe, the United States of America, Egypt, India, China, Japan, Ceylon, and Java.

THE National Education Association (Caxton House, Westminster, England) is appealing for a fund of £2,000 for the purpose of combatting anti-educational propaganda.

DISCUSSION

TEACHERS VS. MENTAL TESTS AS PROPHETS OF SCHOOL PROGRESS

For some while experts have been testing intelligence tests to find out if such tests really test intelligence. But do they know what it is they have found? Undoubtedly they have tried to measure carefully, but are we sure their measuring device is true? One means of measure used more often than any other in such tests is that of school progress. Accordingly, that test which proves a good prophet of school progress is counted good; that one which proves a poor prophet, poor. Ordinarily the school progress has been measured by teachers' marks. In a few studies, however, school progress has been measured in a few subjects, at least, by standardized educational measurements.

But in such tests of tests a correlation of .50 is considered pretty good. Terman found only .48 between teachers' judgment and intelligence quotient by the Stanford-Binet Test. When any one finds .60 or above he seems, usually, to think such a correlation a great talking point for the particular test used or for intelligence tests in general.

Undoubtedly many correlations below .50 have never been published. However, some such lower correlations between ratings by intelligence tests and measures of school progress have appeared in the last few years in educational literature by a few courageous authors.

The average practical school man indeed thinks of intelligence tests as of great prophetic power, and one reason he is enthusiastic about them is that they seem to tell him he is doing his job pretty well. He has the notion that intelligence tests can prophecy school progress "as nothing else can do." He is encouraged in his belief by experts who are making and testing tests. In a very late book on tests and measurements,[1] it is assumed that teachers can not select ability groups with nearly the accuracy with which they can be selected by intelligence tests, when the measure of this accuracy is final judgment of school progress by the teachers. These authors suggest, moreover, that the whole thing is about settled, that the teacher and superintendent easily can determine by rough comparisons whether the intelligence test has "done the trick" or not. To quote from this book:

Verifying results with tests of mental ability. If, for instance a teacher has used a test of mental ability and has made up section divisions on this basis, she should certainly notice whether or not the divisions thus obtained are more homogeneous in mental ability or brightness than similar divisions made in previous years on the basis of her own judgment. She may compare the marks she assigns to the class and see if they are more closely grouped than usual. That is, she may find that the year before, when she made up her section divisions on the basis of brightness as judged by her according to her own observation of the children, there were five children in her "slow" section who received marks distinctly above average, while in the "slow" section as chosen on the basis of brightness according to the test results there were no children who received good marks. In other words, the test results have helped that teacher by grouping the children so that the work done by those in each group was of about the same level.

At the beginning of the second week of the school term in February, 1922, 19 grade teachers, from the first to the sixth grade inclusive, were asked to rank the names of their children in order of the way they believed these children would get along in school work.

When these same teachers made up the official school marks for these same children at the end of the school term the following June, they were asked *unexpectedly* to rank their children on the basis of how well they did get along in school during the term. They were told in both instances to rank no two children at the same place even if they should think several are of the same rank. These teachers then made a prophecy, after a week of school, of how well their children would learn in school. Then at the end of the term they reckoned on how well these same children did learn in school, taking into account all their subjects combined.

How well then did these teachers, after a week with their children prophesy the school progress of these pupils?

A measure chosen of the accuracy of the

[1] Sidney L. Pressey, Luella C. Pressey: *Introduction to the Use of Standard Tests*, The World Book Co., N. Y., 1922. Pp. 222-223.

prophecy is a coefficient of correlation between the two rankings. The Speerman Rank-Difference method was used. The correlations in order of magnitude for the 19 teachers, between their prophecy at the beginning of the school term of how well their children would get along in school, with how well they actually did get along, as reckoned at the end of the term, are, respectively: .97, .93, .93, .91, .90, .88, .86, .83, .82, .82, .81, .80, .79, .78, .76, .74, .73, .66, .63. This means that for teacher K the correlation was .97; for teacher X .93, and so on. Has any one found such correlation between intelligence ratings at the beginning of a school term and measures of school progress at the end of the term?

The most optimistic author and promoter of intelligence test could not hope to get such correlations between an intelligence test, or between a composite score by several intelligence tests, and school achievement.

The above correlations run about the same, moreover, for each of the several grades. Distributed by school grades they are: First grade, .82, .82; second grade, .93, .93, .78, .76, .73, .63; third grade, .97, .88, .66; fourth grade, .90, .83, .79; fifth grade, .93, .81, .80; and sixth grade, .86, .74.

Whereas most of the teachers had had their children for just the current term one teacher had had the same children, or nearly the same children, for four consecutive terms, and two had had them for two consecutive terms. The correlations for these teachers were respectively .90, .86 and .93—all relatively high, as would be expected; but there are some higher correlations for those teachers having their children for the first term. Certainly the difference is not great and the lowest correlation for any teacher is surprisingly high (.63).

Proctor[2] found a correlation between teachers' estimates of the intelligence of high school students and the average school marks of those pupils over a period of two and one half years, of .70. The correlation between teachers' estimates and the I. Q. was only .59, and between school marks and I. Q. was only .54.

Apparently, the average teacher, after a few days with her pupils, can prophesy the relative school progress of these pupils during the term more accurately from her own judgment than she, or any one else, can, by the use of intelligence tests.

If, then, teachers, supervisors and superintendents have in mind merely to find out how well their children are likely to do when all are given about the same program, then let them all, in the interest of economy and accuracy and in the interests of respect for the teacher's wisdom, cease this mad attempt at measuring minds.

To date, little else has been sought; but a few have seen farther. They are thinking of intelligence tests chiefly as a means for finding bright children whom the teacher does not find; as a means for suggestion a richer, fatter course for the abler children and a simpler, leaner one for those least able. Some, moreover, have thought of acceleration.

A more accurate criterion of intelligence tests is not what children *do* under the traditional program, but what they *can do* when the entire school program and course of study is adjusted to their ability and when every child is stimulated to work reasonably near to the limit of his capacity. If, on the other hand, we assume that what children have done is what they could have done, that what they have done is a true measure of what they can do in the future, we are getting nowhere. In that event we are merely assuming that children have had, to date, the best possible opportunities to learn, that their opportunities have been equal and that their habits of study, their industry and general attitude are equal also.

Therefore these high correlations between teachers' prophecy of how their pupils will succeed with the way these same pupils actually do succeed at the end of a term do not seem to get us very far. The size of these correlations is no proof of the accuracy of the teacher's prophecy or of her judgment in prospect or of that in retrospect. There is a strong likelihood, indeed, that such close correspondence indicates poor judgment in one or both cases rather than that it indicates good judgment. For some of these children the prophetic ranking seemed almost fatalistic. Ap-

[2] "Psychological Tests and Guidance of High School Pupils," *Journal of Educational Research Monographs*, No. 1, June, 1921.

parently almost nothing they could have done during the term could have affected their gradings very much. These correlations may suggest a reason for the belief of the average high school youngster and college youth that the "reputation" he establishes with his professor during the first few recitations goes far in determining his final grade in that subject. In other words, it suggests a human frailty, pretty pronounced no doubt, with most teachers.

"But," objects some one, "if the teacher's prophecy had been compared with the rankings at the end of the term by educational tests she might have proved a poorer prophet." We would expect her to seem to prophesy less accurately in that event since there would be two different measuring schemes compared. However, a measurement by ranking seems to have considerable favor for accuracy among those familiar with the "order-of-merit method"; and be it remembered that the children in both instances were ranked, and not merely assigned school marks.

For the teacher who had tested her children on the Thorndike-McCall Reading Test the correlation between her prophecy and the reading test achievement was .70. That same teacher's correlation of rank of prophecy with rank of later general progress was only .87.

Grant for argument that scores by an intelligence test correlate with scores by educational measurements more closely than the latter do with teachers' judgments. (Of course they do not actually.) Even then we have proved nothing about the validity of the intelligence tests in question. We do know that the more verbal the intelligence test, the more like school work, *i. e.*, the more like the educational measurement it is, the closer the correlation between the ratings by the intelligence test and the educational measurement. For example, in an elaborate study of correlation between intelligence tests and educational tests, Gates concludes: "Other things being equal, the more verbal the material, the higher the correlation with school attainment."[3]

[3] Arthur I. Gates: "The Correlation of Achievement in School Subjects with Intelligence Tests and Other Variables," *Journal of Educational Psychology*, May, 1922, pp. 277-285.

Now, inasmuch as the more verbal intelligence tests actually incorporate educational measurements, such as arithmetic tests and various forms of exercises in the manipulation of the English language, what Gates "discovered" is merely that the more like an educational measurement an inteligence test is the more closely the two correlate; *the more the two are alike the more they are like.*

If school attainment, then, however measured, is the criterion of an intelligence test, pray, why not set about at once to devise "intelligence tests" that are as nearly like actual school work as possible? In the last analysis such a test would be an actual educational measurement. But that is merely begging the question, merely an attempt to lift ourselves by our own bootstraps.

The fact then that teachers prophesy future progress of their pupils better than do intelligence tests is no proof that intelligence tests are not superior to teacher's judgment; but it does seem to prove that school progress is no true measure of the validity of an intelligence test. It suggests that ratings by an intelligence test that agree with teachers' judgments are not of so great significance as those ratings that disagree.

Let no one fool himself that he has found a true test of tests. When, after a continuous study of a large number of children over a period of many years, we shall have found a test that best prophesies what the learner under the most favorable conditions can do and a test that makes such prophecy far better than a teacher can make it, that test then shall be the one to be used.

McCall suggests that a nearly perfect intelligence test will require a life time to evolve. He writes:

Criterion of Intelligence.—How may we determine whether a particular test yields a valid measure of intelligence? As was stated a few pages back, what a test really measures is known only by its correlations. The closeness of a test's correlation with what constitutes intelligence is a measure of its excellence as an intelligence test. This is the single ultimate method of choosing such a test. If this condition is satisfied the examiner need look no further. In order to deter-

mine a test's worth, it is necessary to have a number of pupils accurately rated for intelligence. Tests can then be correlated with this rating.

This intelligence rating is usually secured by having the most competent obtainable persons observe the objective behavior of the pupils and, allowing for non-intelligence factors, estimate the degree of intelligence indicated by this objective behavior. There is no reason why these observations should not extend over a life time and then be checked up by historical verdict.[4]

Until then we shall exhaust all means possible to find evidences of learning abilities which the average teacher does not find, and, in doing so, we shall give up our search for tests that merely correlate most highly with school progress.

GARRY CLEVELAND MYERS
CLEVELAND SCHOOL OF EDUCATION

QUOTATIONS

THE HIGHER EDUCATION OF WOMEN

THE names of Bryn Mawr College and of its president, Miss Thomas, who has recently retired, after guiding its fortunes for 37 years, are known wherever interest is taken in the higher education of women. The institution was founded by a member of the Society of Friends on strictly non-sectarian lines, but otherwise untrammeled. There were many useful directions along which it might have developed; it chose, partly under the stimulus of Johns Hopkins University, partly in obedience to the instincts of Miss Thomas herself, to devote itself to a broad general education without special reference to specialized vocations. Taking the view that the natural destiny of 40 per cent. of the graduates was to marry, and to bear and rear children, Miss Thomas decided that such prospective mothers should be made familiar with the great mass of inherited knowledge which is handed on from generation to generation of civilized, educated men. She thought also that the others, who proposed to enter a profession, would gain in the long run were their vocational training superimposed on a broad basis. To secure these objects every student of Bryn Mawr must have had a four years' course of Latin before entering, and must study either Latin or Greek for one year in college. During the four years' curriculum half the student's time must be occupied by obligatory courses in language, letters, philosophy and science. The remaining time is devoted to subjects arranged on the group system, a choice of 71 combinations of studies being given. To provide for individuality, one sixth of the whole curriculum is open to the unrestricted choice of each student. From the beginning the utmost care has been taken to select professors distinguished not only for knowledge, but for research. Many of the best-known names in American scholarship and science have been associated with Bryn Mawr; from a long list of former professors we may select for mention Woodrow Wilson in history; Paul Shorey in Greek; Washburn Hopkins in Sanskrit; E. B. Wilson, T. H. Morgan and Jacques Loeb in biology; E. P. Kohler in chemistry; Cattell in psychology; Harkness in mathematics. Of almost equal importance to the advanced spirit of Bryn Mawr is the devotion of a large part of its endowments to resident research fellowships, open to, and freely bestowed on, graduates of other colleges. The history of the college has shown that high ideals in education not only do not forbid but actually conduce to solid practical success.—*The Times*, London.

EDUCATIONAL RESEARCH AND STATISTICS

SCORES MADE BY SENIORS ON THE HOTZ ALGEBRA SCALES COMPARED WITH SCORES MADE BY HIGH SCHOOL STUDENTS TAKING ALGEBRA

THE present study is an attempt to throw some light on the amount of algebra retained by seniors in one of the large high schools in Michigan. In this high school two years of algebra are offered, but only one year is required of all students. This one year is usually required during the freshman year so that many of the seniors had finished the study of the subject three years previous to this investigation. Some of the students had elected the second year of algebra and consequently had finished the subject only two years before. Since a few of the seniors had entered the high

[4] McCall: *How to Measure in Education*, Macmillan Co., N. Y., 1922.

school at the middle of the year and since a few of the others had failed, it was impossible to make an accurate classification on the yearly basis. However, detailed facts concerning the amount of algebra taken will be presented later.

In attempting to determine the amount of algebra retained since there was not available an adequate measure of the amount of algebraic knowledge possessed by the members of the present senior class at the time they had finished the study of the subject, it was decided to give them and all students taking algebra the Hotz Equation and Formula and Problem Scales and to make comparisons on the basis of the results obtained from these various groups. There is some justification for this procedure inasmuch as the groups under consideration are large enough to destroy any selective factors. Furthermore, the scores on the Army Alpha Test made by the seniors and by the freshmen who constituted the majority of those taking algebra indicated that these two groups were normal groups. The only sign of abnormality in these two groups lay in the fact that there was not quite as high a percentage of the seniors making very high scores as is usually found among high school seniors. No intelligence scores were available for other students who might be taking algebra, but there is no reason for thinking that these students represented a selected group.

Tables I and II show the scores of the students taking algebra at the time the test was given on the Equation and Formula Scale and on the Problem Scale, respectively. In these tables the notation "Algebra I," etc., indicate the courses by semesters, while the notations "3 months," etc., signify the actual amount of time the different groups have studied the subject. The results of these tables show that on both the Equation and Formula and the Problem Scales the group taking Algebra I equalled or excelled the Hotz standards of attainment; the group taking Algebra II attained scores which were much below the Hotz standards and which were almost identical with the scores made by the group taking Algebra I; the groups taking Algebra III and IV made high scores and while there are no

TABLE I

HOTZ ALGEBRA SCORES OF STUDENTS TAKING ALGEBRA

(Scale A, Equation and Formula)

	TIME DEVOTED TO THE STUDY OF ALGEBRA			
Problems correct	Algebra I (3 months)	Algebra II (8 months)	Algebra III (13 m'ths)	Algebra IV (18 m'ths)
12	....	....	....	7
11	....	....	4	8
10	....	....	3	1
9	....	2	7	4
8	....	5	4	2
7	6	11	4	....
6	126	25	3	....
5	185	32	3	....
4	110	22	....	....
3	35	12	....	....
2	12	5	....	....
1	13	....	....	....
0	1	....	....	....
No. of students	488	114	28	22
Medians....	5.4	5.5	9.0	11.5

Hotz Standards: Three months, 4.9
Six months, 7.1
Nine months, 7.1

standards for direct comparison it seems as if they had done as well as could be expected. Little or no progress was manifested between the scores of the groups taking Algebra I and II, but the normal amount of progress existed between the scores of those taking Algebra I and II and the scores of those taking Algebra III and IV. In the light of these

TABLE II

HOTZ ALGEBRA SCORES OF STUDENTS TAKING ALGEBRA

(Scale A, Problem Scale)

	TIME DEVOTED TO THE STUDY OF ALGEBRA			
Problems correct	Algebra I (3 months)	Algebra II (8 months)	Algebra III (13 m'ths)	Algebra IV (18 m'ths)
10	2	1	1	1
9	4	1	3	3
8	15	0	4	9
7	26	5	4	2
6	46	9	11	4
5	70	24	4	2
4	116	23	0	1
3	121	29	0	0
2	61	15	1	0
1	25	5	....	....
0	2	2	....	....
No. of students	488	114	28	22
Medians....	4.3	4.3	6.8	8.2

Hotz Standards: Three months, 4.3
Six months, 4.9
Nine months, 5.6

facts and on the basis of comparisons with standards of achievements in other comparable cities given in the Hotz Manual of Instructions,[1] it seems that all groups save those taking Algebra II were achieving all that could be expected.

An analysis of the personnel of the classes taking Algebra II showed that 90 of the 114 were listed as freshmen, 11 as sophomores, 1 as a junior, and 3 as seniors. Nine members did not indicate the particular class to which they belonged. Ratings on the Army Alpha Intelligence Tests were available for 80 of these freshmen and the median of the scores for this group was 88.5 while the median for the freshman class as a whole was 91.0, a score which is normal for a freshman class in high school. When it is considered that the group taking Algebra II were second semester freshmen who should have made a median score higher than the average of the whole class and also that the group contained various upper classmen, some of whom had previously failed in the subject, it is easily seen that the low scores achieved by this group were due to the particular nature of the class rather than to an inherent weakness in the teaching within the system. If this contention is accepted then it is logical to say that the students in this particular high school are accomplishing as much as those in the usual high school and that a measure of the amount of algebra retained by the seniors in this school ought to be typical of what other seniors are retaining.

Tables III and IV show the scores for the seniors on the Hotz Equation and Formula Scale and on the Problem Scale, respectively. In these tables the headings "Two semesters," "Three semesters," or "Four semesters" indicate that the seniors had previously completed two, three, or four semesters of algebra. As stated before, the seniors usually took these courses during their freshman or sophomore years and consequently two or three years had elapsed since they had actively studied the subject.

These tables show that the seniors who had taken two semesters of algebra made on both scales scores which were just a trifle higher than the scores made by the students who were taking Algebra I. This means that the seniors who had studied algebra for two semesters two or three years previously made scores on these tests only slightly superior to the scores made by the freshmen who had studied the subject but three months. On the Equation and Formula Scale those who had taken three or four semesters did not make quite as good scores as the students who were taking Algebra III and Algebra IV at the time of the testing, but the "shrinkage" here was small compared to the loss in case of those who had completed two semesters. Since each added semester's work in algebra was accompanied by an added increment in the score on the Equation and Formula Scale it seems clear that each semester of instruction in the formal exercises has left its permanent effects. On the Problem Scale the permanent effect of the additional semesters of algebra was not so noticeable. In fact, the seniors who had taken three semesters of algebra did little better than those who had finished two semesters and those who had taken four semesters made a lower score than those who had finished three semesters. The median score for those seniors who had

TABLE III

HOTZ ALGEBRA SCORES FOR HIGH SCHOOL SENIORS
(Scale A, Equation and Formula)

Problems correct	SEMESTERS OF ALGEBRA TAKEN: Two semesters	Three semesters	Four semesters
12	....	1	4
11	....	2	1
10	....	9	4
9	4	10	1
8	5	14	1
7	11	16	2
6	29	16	0
5	32	11	0
4	19	6	0
3	4	4	1
2	5	1	....
1	5	....	....
0	2	....	....
No. of students	116	90	14
Medians	5.6	7.4	10.5

Hotz Standards:	
Three months	4.0
Six months	7.1
Nine months	7.1
Standards for students taking algebra:	
Algebra I	5.4
Algebra II	5.5
Algebra III	9.0
Algebra IV	11.5

[1] Hotz, Henry G.: "Teacher's Manual for First Year Algebra Scales."

TABLE IV
HOTZ ALGEBRA SCORES FOR HIGH SCHOOL SENIORS
(Scale A, Problem Scale)

Problems correct	SEMESTERS OF ALGEBRA TAKEN: Two semesters	Three semesters	Four semesters
10	2	2	1
9	2	9	0
8	5	4	2
7	6	10	0
6	13	11	2
5	19	20	3
4	29	22	4
3	29	7	1
2	7	4	1
1	2	1	....
0	2	....	....
No. of students	116	90	14
Medians	4.7	5.6	5.3

Hotz Standards:	
Three months	4.3
Six months	4.9
Nine months	5.6
Standards for students taking algebra:	
Algebra I	4.3
Algebra II	4.3
Algebra III	6.8
Algebra IV	8.2

taken three or four semesters of algebra was no higher than the Hotz standards of achievement for two semesters. Thus the "shrinkage" in the ability to solve written problems if the scores on the Problem Scale are a true indication is very marked.

The cause of the greater "shrinkage" in the ability to solve exercises on the Problem Scale than on the Equation and Formula Scale is problematic. It may have been due to the fact that much more practice is given in ordinary teaching of algebra to the solution of problems stated in the form of the equation, or it may have been due to the fact that reading the problem and formulating the equation requires a higher ability than merely solving a given equation. It may have happened also that the teachers of algebra are more effective in teaching the formal aspects of the subject than in teaching the problem aspects.

In general this investigation shows that the seniors had retained a relatively large amount of the knowledge of the more formal aspect of algebra but a comparatively small amount of the more complex problem aspect of the subject. The amount of both aspects of the subject retained by some students was all that could be expected, but the "shrinkage" manifested by other students through their inability to solve the easiest problems on the Hotz scales is almost inconceivable. However, it should be pointed out that the present measurement measures only the *status quo* and does not measure the latent ability which might be rapidly improved by a minimum of practice. A full measurement of the permanent effects of the teaching of the subject would have to take into consideration the amount of time required for bringing the particular groups concerned to a standard level of achievement.

CLIFFORD WOODY
SCHOOL OF EDUCATION,
UNIVERSITY OF MICHIGAN

SOCIETIES AND MEETINGS

CHILDREN'S BUREAU CONFERENCE ON PROBLEMS AND STANDARDS OF EMPLOYMENT CERTIFICATE ISSUANCE

IN recognition of the fact that the measure of protection afforded children in industry depends primarily upon the carefulness with which work permits are issued to children leaving school, a conference on Problems and Standards of Employment Certificate Issuance was called by the United States Children's Bureau in conjunction with the annual meeting of the National Education Association in Boston, in July. A committee appointed by the National Education Association cooperated with the Children's Bureau in arranging the meetings. The conference was attended by a number of state labor and education officials and by local school officers charged with the issuance of employment certificates.

The first session, presided over by Miss Abbott, of the Children's Bureau, was devoted to a discussion of the problems and procedure of the local certificate issuing office and the supervision of local issuance by state agencies. In the opening paper, Miss Anne Davis, director of the Vocational Guidance and Employment Certificate Bureau of the Chicago Public Schools, emphasized especially the function of the issuing office in educating school principals, employers of children and the public in the procedure of obtaining employment certificates and in the problems of the issuing office, to the end that children may be kept in school, child

labor reduced to a minimum, and workers given guidance and supervision during the first years of their working life.

Continuing the discussion on the organization of the local office, Miss Edith Campbell, director of the Vocation Bureau of the Cincinnati Public Schools, in a paper on "The value of certificating office records to the student of child labor problems," pointed out that statistics on work permits bear the same relation to such problems as retardation and industrial stability as vital statistics to health education, and showed how the study and organization of facts that can be discovered only through a well-organized certificating office lead to the reorganization of school grades, closer cooperation between the schools and local industries, and greater responsibility on the parts of the schools for children who leave school to go to work.

"The relation of certificate issuance to the enforcement of school attendance laws" was discussed by Mr. Arthur P. Lederle, director of attendance of the Detroit public schools, who commented especially on the need for careful "accounting" of children through an effective school census.

The subject of state supervision of the local office was one in which unusually keen interest was shown by both school and labor officials. Mr. Taylor Frye, of the Wisconsin Industrial Commission, in a paper on "State supervision of the issuance of certificates," described the experience of the Wisconsin commission in holding local issuing officers and employers up to recognized standards. The commission, he stated, is clothed with power to interpret and apply the child labor law and make rulings which are of state-wide application and have the force of law. Others contributing to the discussion of the relation of state agencies to the local certificating office were Mr. Pringle, of the State Board of Education of New Hampshire, Mr. Sturges of the Connecticut Board of Education, and Mr. Small of the Massachusetts State Department of Education.

Methods of administering the various standards of the child labor laws were the subject of discussion on the second day of the conference. A paper which brought forth considerable discussion was "The enforcement of a physical standard," presented by Dr. Wade Wright, director of the Industrial Clinic of the Massachusetts General Hospital. Dr. Wright urged the necessity of selective placement in industry, implying, as he pointed out, a study of the job as well as of the man, and called attention to the need of further study to establish standards of normal health and physical development. While believing that more careful and effective medical supervision in the schools is of fundamental importance, Dr. Wright emphasized the value of examination prior to certification as a means of preventing the employment of substandard children at work which would probably prove detrimental to their health and as a basis for comparison with findings of subsequent examinations to ascertain the physical effects of early employment upon the immature.

Other speakers on methods of effectively enforcing age, educational and other provisions of child labor laws were Miss Esther Lee Rider of the Alabama Child Welfare Commission, Miss Jeanie Minor, of the New York Child Labor Committee, and Dr. E. J. Lickley, director of the Compulsory Attendance and Child Welfare Department of the Los Angeles public schools.

At the end of the meeting a resolution was passed asking the Children's Bureau to call a similar conference in connection with an early meeting of the National Education Association, at which special attention would be given to the discussion of the regulation of street trading among children.

NATIONAL COUNCIL OF TEACHERS OF ENGLISH

THE program meeting of the National Council of Teachers of English in Boston on July 6 and 7 was quite successful, both from the standpoint of attendance and enthusiasm.

The Thursday afternoon session at Wentworth Institute was devoted to the problem of suiting assignments to the abilities of pupils. Mr. Charles L. Hanson, of the Mechanic Arts High School, Boston, began the discussion, saying that he did not believe in the classification of pupils according to ability, because the brighter ones needed contact with the duller, and because the brighter ones stimulate the

teacher to do better work for the whole group. He argued, moreover, that these brighter ones find themselves special tasks both in the schoolroom and outside, that it is easy to supply them with extra reading and memorizing, that they may be called upon to lead democratized recitations, and that they may be saved from conceit by occasional interclass competitions in which they meet their equals.

Dr. Dudley Miles, head of the Department of English in the Evander Childs High School, New York City, declared that we frequently fail to find unusual ability or to develop it. We are too much burdened with large classes and the pressing needs of poor pupils and frequently we are looking only for special ability to write or to appreciate literature and so overlook high general intelligence and directive ability. The kinds of ability for which we look are very easily cared for by publicity for the expressive and by extra reading for the appreciative. Pupils who have high general intelligence frequently have no special literary bent, but may be occupied in giving supplementary reports. Those who have directive ability may develop it in the socialized recitation. Standard tests will help in the discovery of these special abilities, and classification according to ability gives the teacher a better chance to deal effectively with individuals.

Miss Lillian E. Whiton, of the Hugh School at Long Beach, California, who was unable to be present, sent her paper, which related how she had been able to save almost all of a very slow ninth-grade class, the members of which previous experience showed, would have fallen out before the end of the first semester in high school. These pupils were segregated, largely upon the basis of an intelligence test, were given literary selections especially suited to them, and were allowed three semesters to do the work accomplished by ordinary pupils in two semesters.

Mr. Ralph P. Boas, head of the department of English, Central High School, Springfield, Massachusetts, concluded the discussion. Administrators, he said, sometimes block the efforts of the classroom teacher, as he had in one instance done by insisting upon segregating the very slow. He agreed with Mr. Hanson that classification according to ability is not wise. Extra-classroom activities fairly reach out for the especially able, until they are frequently overburdened. After all, scholarship should come first. If there is strict grading and promotion only of those who are able to do the advanced work, there will not be such difference of ability as to make satisfactory handling impossible. Rewards for those who do especially well will stimulate effort and classification according to interests, that is, college preparatory, commercial, and technical, will make the classes homogeneous.

At the Friday joint session with the Library Department of N. E. A. Mr. A. B. deMille, of Winthrop Highlands, Massachusetts, in his paper upon "Books for Boys" advocated (1) giving the pupils a taste of interesting books by reading a few paragraphs now and then at the end of recitations; (2) enlisting other departments in the attempt to interest pupils in wide reading, frequently non-fiction; (3) using books that have already been approved by several school generations of boys. Mr. deMille presented a mimeographed list of books which he has used successfully, which he had prepared for the New England Librarians' Association.

Dr. Percy W. Long, of the Massachusetts Department of Education, told of the new School and Poetry Association which has been organized to stimulating the reading and production of poetry by young people, and called attention to the sample copies of *The Gleam*, a magazine edited as the organ of the society by Paul S. Nickerson, principal of the High School at Canton, Massachusetts. Professor George Herbert Palmer, of Harvard, is president of the new association.

Miss Helen Cosgrove, of the Horace Mann School, New York City, speaking of the stimulation of outside reading, insisted that the principal object of the study of literature is fun and that the teacher's business is to enjoy books with the children, discussing them frankly rather than dictatorially and so arousing interest and genuine, not pretended, appreciation. To do this successfully the teacher must be widely read and genuinely discriminating.

W. WILBUR HATFIELD
THE NATIONAL COUNCIL OF
TEACHERS OF ENGLISH